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ABSTRACT

To determine the effects of deficient reading skills in the military service, researchers met with military and civilian officials from four recruit training centers, major research activities personnel, and the commands accountable for education and training. Next, questionnaires were sent to fifteen recruit training centers to obtain data on the services' remedial reading programs. On-site reviews of remedial reading programs in each of the services were conducted. Several adverse effects of poor reading ability were found. Poor readers (1) were discharged at higher than normal rate; (2) face difficulty in technical training; (3) do not perform as well on the job; and (4) have limited career potential. Among the efforts of the Department of Defense (DOD) to alleviate this problem was the development of reading improvement programs. Efforts were also made to reduce the difficulty of reading material that personnel must use, but further efforts are needed in this area. Among the suggested alternatives to alleviate this problem were more selective recruitment, reevaluation and redesign of literacy training programs, and simplification of reading materials. It was recommended that more efforts in this area be made. (Locations visited and characteristics of the DOD reading remediation programs are appended.) (CT)

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UNITED STATES
GENERAL ACCOUNTING OFFICE

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A Need To Address Illiteracy Problems In The Military Services

Department of Defense

Military services' data indicate some enlisted personnel have reading abilities below the written material they are expected to use during their careers. This problem is not new to the services, and a continued flow of recruits with low reading ability is predicted. When compared to the normal recruit population, poor readers tend to

--have higher discharge rates,

--experience more difficulty in training,

--perform less satisfactorily on the job, and

--lack the potential for career advancement.

The Secretary of Defense needs to develop a policy to effectively address the illiteracy problem.

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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MARCH 31, 1977

UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

FEDERAL PERSONNEL AND
COMPENSATION DIVISION

B-175773

The Honorable
The Secretary of Defense

Dear Mr. Secretary:

This report discusses the problem of illiteracy among some enlisted personnel and the services' attempts to deal with it.

Our recommendations to you are set forth on page 24. As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement on actions taken on our recommendations to the House Committee on Government Operations and Senate Committee on Governmental Affairs not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

Copies of this report are being sent to the Director, Office of Management and Budget; the Chairmen, House Committee on Appropriations and Senate Subcommittee on Defense; Chairmen, House and Senate Committees on Armed Services; Chairman, House Committee on Government Operations; Chairman, Senate Committee on Governmental Affairs; the Secretaries of the Army, Navy, and Air Force, and the Assistant Secretary of Defense (Comptroller). Copies are also being sent to the Secretary of Health, Education, and Welfare; the Commissioner of Education; and the Director, National Institute of Education.

Sincerely yours,

H. L. Krieger

H. L. Krieger
Director

GENERAL ACCOUNTING OFFICE
REPORT TO THE SECRETARY
OF DEFENSE

A NEED TO ADDRESS ILLITERACY PROBLEMS IN THE MILITARY
Department of Defense

D I G E S T

A recent U.S. Office of Education study revealed that 22 percent of American adults do not have sufficient reading skills to effectively cope with daily life. GAO wanted to determine whether this condition extends to the military services and, if so, what effect it has on military operations.

GAO found that the illiteracy problem has existed in the services for years. Many military studies identified a gap between the reading level of enlisted personnel and the difficulty of written material they are expected to encounter during their careers. The Department of Defense, however, does not have enough information to determine the extent of the problem.

The services have implemented programs costing over $3 million annually to improve selected individuals' reading ability and have committed at least $8 million in an attempt to reduce the difficulty of the written material. Many research projects have been conducted by the services on various aspects of the illiteracy problem. However, Defense has not established a policy to address the total problem, nor has it stated whether it assumes a general responsibility for improving the literacy of enlisted personnel.

GAO found that poor readers, compared to the average enlisted population, tended to

--have higher discharge rates,

--experience more difficulty in training,

--perform less satisfactorily on the job, and

--lack the potential for career advancement.

Such conditions are not only costly to the services but are an obstacle to effective use of manpower. To correct the situation, the services have several options including more selective recruiting, revising training programs, reducing the difficulty of reading materials, and improving the reading ability of personnel; a combination of alternatives may be desirable.

RECOMMENDATIONS

GAO recommends that the Secretary of Defense develop a policy to address the illiteracy problem and have the Department to:

--Determine the reading grade level required for each military occupation and assess the magnitude of the services' illiteracy problem within each occupation.

--Establish an overall minimum reading grade level required for enlistment that will still allow the services to meet their quantity goals, and consider establishing a specific reading grade level requirement to enter each occupation.

--Determine reading ability before enlistment so that if very poor readers do not qualify for military service, they can be counseled to seek help from civilian programs.

--Intensify efforts to reduce the complexity of written materials.

--Decide the extent of efforts to improve the reading skills of military personnel as a matter of general responsibility.

--Analyze the value and effectiveness of current remedial training programs in improving trainability and job performance.

--Should remedial programs be continued, make certain that they are integrated with

skill training, career counseling, and general education development; and provide central, coordinated control of the programs including standardized eligibility criteria, course content, goals, and evaluation systems.

--Coordinate efforts with the U.S. Office of Education and the National Institute of Education to benefit from their expertise and research on the national illiteracy problem.

In view of the possible consequences of the illiteracy problem on the operational effectiveness of the military services, we recommend the Secretary of Defense consider reporting annually to the Congress on progress being made to alleviate the problem of illiteracy among military personnel.

Contents

		Page
DIGEST		i
CHAPTER		
1	INTRODUCTION	1
	Scope of review	6
2	ADVERSE EFFECTS OF POOR READING ABILITY	7
	Poor readers discharged at higher than normal rate	7
	Poor readers face difficulty in technical training	9
	Poor readers do not perform as well on the job	9
	Poor readers have limited career potential	10
3	EFFORTS BY THE DEPARTMENT OF DEFENSE TO ALLEVIATE THE ILLITERACY PROBLEM	12
	Reading improvement programs	12
	Factors limiting effectiveness of remedial reading programs	13
	Programs not geared to functional requirements might be less successful	14
	Programs are of limited duration	15
	Lack of long-term evaluative data precludes comprehensive assessment of program effectiveness	15
	Efforts to reduce the difficulty of reading material	15
	Further efforts are needed	17
4	ALTERNATIVES AVAILABLE TO ALLEVIATE THE ILLITERACY PROBLEM	19
	More selectivity in recruiting could reduce the numbers of poor readers	19
	Total manpower requirements may not be achieved	19

CHAPTER		Page
	Academic achievement should be used cautiously as a guide in recruit selection	20
	Need to reevaluate literacy training programs	21
	Redesigned training programs could assist poor readers	22
	Simplifying reading materials can partially alleviate the problem	22
5	CONCLUSIONS AND RECOMMENDATIONS	24
	Conclusions	24
	Recommendations	24
APPENDIX		
I	Locations visited	26
II	Characteristics of DOD reading remediation programs	27

ABBREVIATIONS

DOD	Department of Defense
OE	U.S. Office of Education
RGL	reading grade level

CHAPTER 1

INTRODUCTION

A 1975 U.S. Office of Education (OE) study disclosed that 20 percent of the American adult population lacked the basic communication and computational skills to effectively cope with everyday life; specifically, only 46 percent of the adult population was estimated to be competent readers, while 32 percent function but not proficiently and 22 percent function with difficulty.

Several military studies indicate that this problem carries over to the services. These reports show that a gap between the reading ability of enlisted military personnel and the reading difficulty of written materials they are expected to encounter during their careers will adversely affect their performance. The following quotations reflect the nature of the studies:

--In the prologue to an April 1974 report on literacy training programs in the services, Dr. M. Richard Rose, then Deputy Assistant Secretary of Defense for Education, stated that "* * * estimates 1/ of a continued flow of (recruit) accessions with reading problems into the Armed Forces are essentially correct * * *. Progress in dealing with the literacy problem is essential if the productive potential and more effective utilization of a portion of our manpower resources are to be achieved."

--The Air Force in an October 1975 report concluded that: "In absolute numbers the existence of a 'reading problem' appears to be a legitimate concern, particularly if one realizes that the turnover of personnel is a long term process and that enlistment criteria are likely to fluctuate downward from the January 1975 level."

--Referring to men who read at less than the eighth grade level, a Navy study, reported in October 1975, stated that: "These men may be expected to comprehend most Navy material if they can reread the material and are assisted by other personnel.

1/Specific figures were not mentioned in the report.

However, the efficiency of their job performance will most likely be impaired and of a marginally acceptable level. If these men are required to act in a time of emergency in any way that requires the use of printed material, they may well prove to be a hazard to effective Navy operations."

--Army researchers reported in 1975 that "* * * the ability to perform adequately on many military jobs is determined to some extent by the individuals' ability to read * * *. Men (who read below the level of the manuals and materials) * * * can be expected to experience difficulty in using instructional materials and manuals in training for or performing their military jobs."

--In a November 1975 letter, the Commandant of the Marine Corps noted "* * * concern not only for the recruits who are deficient in reading skills but also for those Marines whose skills are not at levels which enable them to compete sucessfully in technical training." He went on to say "* * * the objective (of a large-scale reading program) would be to increase the probability of each Marine's success in assimilating the technical requirements after completion of recruit training."

The Department of Defense (DOD) is apparently concerned about the illiteracy problem and its impact on military operations. The problem is not new nor has DOD totally ignored it. For years, however, the services have recruited individuals whose reading ability was below that of the material they were likely to encounter during their careers either on the job or in a general sense (e.g., ability to read notices, warning signs, and emergency procedures). The effect of illiteracy on the services is not readily quantifiable and has never been fully assessed.

Although we have examined only the reading problem, other elements should be considered in solving the general illiteracy situation. These elements include oral communication, comprehension, the relationship of reading to job skills, the redesigning of skill training through a systems approach, career counseling, and general education development.

DOD does not compile information on the overall reading ability of military personnel and cannot, therefore, accurately gage the magnitude of the illiteracy problem. Isolated studies

have been performed by and for the services which indicate the reading ability of enlisted personnel entering the services. For example, a reading test was given to about 25,000 recruits entering the San Diego Naval Training Center between May 1974 and March 1975. The test result (shown below) indicated that 18 percent were at a reading grade level (RGL) below 8.0 which some authorities consider roughly the minimal level required to adequately function in society. The overall test results were:

RGL (note a)	Percent of recruits
Less than 4.0	1.8
4.0 to 5.9	5.7
6.0 to 7.9	10.6
8.0 to 9.9	18.3
10.0 and above	63.5

a/RGL indicates the academic grade level and month at which the individual is reading. For example, a 4.5 means the person reads at a level comparable to one who is in the 5th month of the 4th grade.

In fiscal year 1975, Navy researchers compared recruits' ability to read to the readability levels of manuals they are expected to read and found that 40 to 50 percent of the recruits had a reading ability below that of their job-related reading material. Research data indicated the average difficulty of training school materials was 14.0 (second year college level), while the median reading ability of San Diego recruits was 10.5. Twenty-five percent of the recruits tested read below the 8.7 RGL or more than five grades lower than the materials they would encounter in formal training.

A September 1976 research report sponsored by the Navy concluded the following:

> "Based on the Navy Job Reading Task Interview data and the results of the NRTT 1/ scaling, it was concluded that approximately 10 to 20 percent of the Navy's enlisted population have reading problems. However, the severity of the problem may be somewhat hidden by the repetitive nature of the job tasks

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1/Navy Reading Task Test.

which permit repeated opportunities for learning the necessary information by rereading and repeated job performance. Since it was found that reading deficiency could act as a barrier to advancement, this has a limiting effect on the person's career and his utility for the Navy. Thus, it is not in the best interest of either party to ignore the reading deficiency. It seems feasible to reduce the amount of job skill 'nice-to-know' information without effecting the quality of entry level job performance. This reduction would effect training time, as well as cost savings, which could then be used to provide reading skills training without adding additional time or cost to the current training system. Thus, it does appear to be feasible to develop an integrated job skills/reading skills training system which might permit the marginally skilled person to have a more satisfying career in the Navy while simultaneously providing a more competent Navy force."

Data compiled by the San Diego Marine Corps Depot on 19,460 recruits between February 1975 and January 1976 revealed that 25 percent read below the eighth grade level. 1/ ("The Guidebook for Marines," which contains basic military information and is used during recruit training, is written at approximately the 8th grade level.) The following chart summarizes the Marine Corps findings concerning recruit reading ability:

1/The total of recruits during this period was 29,690; at least 16 percent of all recruits read below the 8th grade level.

RGL	Number	Percent of total recruit input
0.0 to 2.9	103	less than .5
3.0 to 3.9	238	1
4.0 to 5.5	1,174	4
5.6 to 7.0	2,077	7
7.1 to 7.9	1,287	4
8.0 to 9.9	4,326	15
10.0 and above	10,255	35
Not tested (note a)	10,230	34
Total	29,690	100

a/The 10,230 recruits not tested had high scores on their qualifying examinations for military service. Program officials assumed that these individuals read above the 10th grade level.

Studies have shown the average reading ability of Army personnel to be at the 9th grade level, while the average level of reading material used is above the 11th grade level. Data compiled by the Army's Training and Doctrine Command showed that about 20 percent of 38,000 recruits tested at Army reception stations between January 1 and March 31, 1976, read below the seventh grade level.

The Air Training Command gave reading tests to 40 percent of all nonprior service recruits and all trainees failing technical training over a 90-day period in early 1975. The results showed that only about 4 percent of the recruits read below the ninth grade level, with the mean reading level being 12.1. The average grade level of the technical-training-academic attritees from five training centers was 10.5. The study results indicate that reading problems are not as severe among the Air Force personnel.

Although the referenced studies do not emcompass all military personnel, the number of enlistees tested was adequate to suggest that many servicemen's reading ability is well below that of the reading material they must use. The studies may understate the extent of the problem, since they are very recent and reflect a higher quality of recruit due to the current favorable recruiting environment rather than the total population of the services. Furthermore, the increasing technological complexity of equipment and weaponry could result in shortages of qualified (literate) personnel in some military occupations.

SCOPE OF REVIEW

To determine the effects of deficient reading skills in each service, we met with military and civilian officials from four recruit training centers, major research activities, and the commands accountable for education and training. We also dealt with operational personnel and headquarters officials. (See app. I for a complete list of activities visited.) We sent a questionnaire to all 15 recruit training centers to obtain data on the services' remedial reading programs. (See app. II.) We conducted on-site reviews of remedial reading programs in each of the services.

CHAPTER 2

ADVERSE EFFECTS OF POOR READING ABILITY

Adverse effects, which officials and researchers said relate to poor reading ability, include high attrition or discharge rates, poor performance in training and on the job, and limited career potential. However, demonstrating a direct causal relationship between reading ability and its effects is difficult because many factors can contribute to these problems. For example, reading correlates highly with general aptitude, so it is difficult to determine if an individual's poor job performance is due to poor reading ability or low aptitude. Further, it migh be poor motivation or lack of self-discipline, rather than inadequate reading ability, that caused an individual to be eliminated from technical training or discharged.

Keeping in mind these qualifications, available information demonstrates that low readers, when compared to the average military population (1) have higher discharge and attrition rates, (2) experience more difficulty in technical training, (3) perform less satisfactorily on the job, (4) and have less potential for career advancement. Such conditions are not only costly but inhibit effective use of manpower.

POOR READERS DISCHARGED AT HIGHER THAN NORMAL RATE

Data on 23,000 recruits at the San Diego Naval Training Center between June 1974 and January 1975 demonstrated that low readers were discharged during training at much higher rates than better readers, as shown below:

RGL	Percent discharged
Less than 4.0	64
4.0 to 5.9	20
6.0 to 7.9	10
8.0 to 9.9	7
10.0 to 12.0	4

The researchers that developed the above data were not able to state unequivocally that a direct cause/effect relationship existed between reading ability and recruit discharges. They concluded that reading ability contributes significantly to the prediction of discharges during recruit training, independently of other variables.

Data from reading remediation programs we visited indicated that participants in such programs, even after improving their reading skills, were less likely to complete recruit training than other recruits. For example, at the San Diego Marine Corps Recruit Depot where recruits reading less than 4.5 were admitted to a remediation program between February 1974 and January 1975, almost 30 percent of the participants did not graduate from recruit training. During that period, the recruit discharge rate for the Marine Corps as a whole ranged from about 11 to 15 percent.

A report on the Air Force remedial reading program showed a 30 percent discharge rate for program participants in 1974, compared to an 8 percent rate for all recruits entering basic training.

We found one study which tracked remedial reading program participants throughout their military careers. The study charted the discharge rate of 1,515 Navy enlistees who had participated in remedial reading programs between 1967 and 1972. The groups' average reading grade level when entering the program was 3.75. The researchers found that 56 percent of the poor readers had either been prematurely discharged from the Navy or had completed an enlistment and not been recommended for reenlistment.

The Department of Defense has focused some attention on this problem through its various remedial reading programs. Several military officials said that a major purpose of remedial reading programs was to reduce discharges or attrition in recruit training and technical training. They reason that enlisted personnel are not at a productive level until they reach their first duty assignment, so to discharge someone during recruit training or technical training represents almost a total loss to the services. Costs associated with these early discharges include pay, travel, recruiting, clothing, and training expenses. The following chart summarizes services' data on the average cost per recruit discharged.

Service	Average cost per recruit not completing recruit training
Air Force	$2,871
Marine Corps	2,473
Army	2,265
Navy	1,881

POOR READERS FACE DIFFICULTY IN TECHNICAL TRAINING

After graduating from recruit training, most personnel receive technical training or advanced training in an occupational speciality before being assigned to a duty station. For example, approximately 70 percent of the graduates from Navy recruit facilities receive such training, while the Air Force's figure is about 85 percent. Of course these percentages are not representative of low readers, because many poor readers do not qualify for technical training.

Although the reading requirements of technical training vary among courses, several instructors said that poor readers were less likely to perform well. Some instructors said that they had to individually tutor low readers and redesign their instructional approach to place less emphasis on reading.

The initial results of a Navy research study reinforce these observations. Researchers found important correlations between reading ability and test performance in certain Navy "A" school (occupational training) courses. According to the researchers, a relationship seems to exist between reading level and technical training performance.

A 1975 Navy study conducted at a Navy technical training center reported that "the reading problem is especially serious in the A schools in the volunteer Navy of today." This situation was attributed partly to (1) public schools not adequately teaching reading skills and (2) the increasing complexity and demands of many Navy ratings.

From September 1974 through June 1975, Air Force researchers examined the reasons for student attrition in 53 courses at 5 technical training centers. According to the researchers, about 900 students attrited for academic reasons with about 12 percent of those attributed to inadequate reading ability.

POOR READERS DO NOT PERFORM AS WELL ON THE JOB

According to Navy researchers, research relating reading ability to job performance has been limited and has encountered at least two obstacles. First, it has been found that reading ability and general aptitude are highly related, making it difficult to isolate reading as a variable affecting job performance. Second, identifying appropriate measures of job performance has been difficult.

Notwithstanding these problems, research indicates that reading ability does affect job performance. A Navy research report states:

> "Clearly, reading is essential to job performance if personnel are to operate autonomously * * * The effectiveness and efficiency of job performance, therefore, will be reduced to the extent that the reading difficulty of job materials exceeds the reading ability of personnel * * *"

An Army report discussing the literacy problem stated that

> "We have seen that * * * there is a consistent positive relationship between reading ability and job proficiency."

Discussions with military supervisory personnel underscored these findings. They noted a number of instances where subordinates with reading problems had difficulty comprehending written instructions. Several supervisors commented that they had to spend extra time redoing the work of poor readers of teaching them how to do it properly.

POOR READERS HAVE LIMITED CAREER POTENTIAL

Officials we interviewed often cited lack of career potential as an adverse effect of poor reading ability. Officials stated that low readers may be able to reach the E-4 level (in a career scale ranging from E-1 to E-9), but promotion above that grade was unlikely because of additional administrative responsibilities and reading requirements at higher levels and because advancement is based on written examinations, as well as job performance.

The Navy study that tracked 1,515 sailors who had received remedial reading training supports the contention of limited career potential for poor readers. The research stated that as of March 1976, 186 of the sailors were still on active duty. Those individuals had been in the service from 3-1/2 to 8 years; most had been in at least 4 years. Although sailors normally are promoted to E-4 within 30 months of the time they enter the service, about 47 percent of the remedial reading participants still in the service were E-3 or below after at least 42 months of active duty. Further, although sailors normally reach E-5 within 47 months, only 16 percent of the participants reached E-5 or above despite the fact that most of them had been in the service for 4 years, or more and some had been in as long as 8 years.

Army researchers indicated it is unlikely that persons who read below a fifth or sixth grade level would be able to adequately handle the reading requirements for initial job assignments, much less those for higher level positions.

Lack of career potential is also manifested in the fact that low readers are often assigned to "labor force" positions (which still require minimal reading skills) rather than the more technical skill areas. For example, few graduates from the Navy's reading remediation program enter technical training; instead, they receive apprenticeship training to become seamen, airmen, or firemen. Similarly, most graduates of the Marine Corps and Army literacy programs have military occupational specialities related to infantry, combat arms, and other nontechnical positions. The exception is that the Air Force graduates usually went into a variety of occupations, including administration, security, and aircraft maintenance. Data was not available on the success rate of those Air Force personnel that entered technical programs after completing reading remediation.

Several studies conducted within DOD have created an awareness of the illiteracy problem. Even though a Department-wide program and policy have not been developed to alleviate the adverse condition, the individual services have taken some action.

CHAPTER 3

EFFORTS BY THE DEPARTMENT OF DEFENSE TO ALLEVIATE THE ILLITERACY PROBLEM

Having recognized that many enlisted personnel suffer from limited reading skill, the four services have taken some actions to improve the likelihood of a successful military career for poor readers. Reading improvement programs and programs to reduce the difficulty of reading materials are used most frequently to close the literacy gap between enlistees and their reading materials. The specific type of program and eligibility screening often varies by location, even within a service.

READING IMPROVEMENT PROGRAMS

Each recruit training center that offers a remedial program gives a reading test to some or all recruits to identify persons in need of remedial reading training. (See app. II.) If test results indicate serious reading problems, recruits are transferred to remedial reading programs for verification of reading deficiencies.

Eligibility criteria for participants in remedial reading programs varies among the services. At the San Diego Marine Corps Recruit Depot 1/ recruits who read below 4.5 are admitted to the program, while in the Air Force those who read below 6.0 are admitted. Entry level criteria of the three Navy programs ranged from 3.0 to 6.0, and the entry eligibility at the Army installations ranged up to 7.0. With the exception of the Army, these criteria have been established somewhat arbitrarily. By contrast, the Army inventoried the reading demands of several occupational fields and determined that Army personnel should be able to read, as a minimum, at the seventh grade level and, accordingly, remedial reading programs should be aimed at producing no less than a seventh grade reading ability.

Responses from 11 of 15 military training centers indicated that approximately 337,000 recruits were at those centers during 1975; about 5,800 recruits participated in remedial reading programs. The estimated cost of the

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1/Parris Island did not have a program at the time of our review.

remediation programs was about $3.5 million, 1/ as shown below.

Service	Amount	Cost per graduate
Navy	$ 574,435	$864
Army	2,440,226	809
Marine Corps	a/371,504	608
Air Force	176,927	602
Total	$3,563,092	$668 (average)

a/Includes program participation in the amount of $85,000 by a local community college district.

Approximately 92 percent of the total participants graduated from the reading programs. The following table summarizes services' data on the extent of participation and rate of successful completion of the 11 programs.

Service	Total number of recruits	Number of program participants	Program graduates	
			Number	Percent of participants
Navy	93,967	920	665	72
Army	138,125	3,880	3,764	97
Marine Corps	29,746	711	611	86
Air Force	75,000	310	294	95
Total	336,838	5,821	5,334	92

More detailed information on each program, such as types of instructors, program organization, and graduation criteria, is contained in appendix II.

Factors limiting effectiveness of remedial reading programs

Several programs reported impressive gains in participants' reading ability in calendar year 1975, but the results were somewhat misleading and might be inflated due to testing

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1/This estimate is incomplete and generally includes instructor costs and recruit salaries, but not supplies or other support costs.

phenomena 1/ that tend to overstate such scores. The following table summarizes the reported gains for all programs during 1975.

Service	Average preprogram RGL	Average post-program RGL	Average gain in RGL
Navy	4.8	6.6	1.8
Army	4.5	6.4	1.9
Marine Corps	3.9	6.1	2.2
Air Force	5.2	7.5	2.3

The average gains in the participants' reading ability appear impressive in view of the limited length of the programs. However, some researchers and others within the services believe the programs' compressed nature and general lack of orientation toward functional or military requirements may hinder long-term benefits. We believe that these brief, one-time efforts, as presently structured, do not substantially reduce illiteracy.

Programs not geared to functional requirements might be less successful

The Navy, Marine Corps, and Air Force use a general literacy approach in their respective remediation programs which emphasizes basic reading skills and concepts. The Army uses a functional literacy program which contains general reading instruction but is also geared toward the recruit's military occupational speciality. In the Army program, concepts and material from the individual's career field are used, and the student learns to apply rudimentary reading skills by using job-related material.

Army researchers demonstrated that the functional literacy program yielded greater gains in job-related reading ability than in general reading skills, and that students were more likely to retain their improved, functional reading skill gains because of its immediate application to their military assignments. The researchers concluded:

1/Long known to educational researchers and program evaluators, these phenomena (known technically as "pretest sensitization," "memory bias," and "regression artifacts") are discussed in detail by Campbell and Stanley in R.L. Gagne (Ed.) Handbook of Research on Teaching. Chicago: Rand McNally, 1963.

"* * * The substantially greater retention of the previously-learned job reading skills illustrates again the effectiveness of training in those skills which will be practiced, applied, and retained in the training and job situations which follow the period of intensive reading training."

Data from two of the general literacy programs supports the Army findings. At one naval training center, a sample of remedial reading participants lost an average of about half of their gains within 2 to 7 weeks after completing the program. A special study of selected graduates from the Air Force reading program revealed that half lost from 1 to 3 reading grade levels within 6 months after course completion.

Programs are of limited duration

The services' remediation programs are of a short duration, ranging from 1 to 8 weeks. Army researchers opted for the functional literacy approach because they concluded it was not feasible to provide poor readers the equivalent of 2 or 3 years of schooling in less than a 2-month period. The researchers asserted that it would be more feasible and productive to provide a program for the type of reading required in training and on the job, if the services are only willing to devote short periods to improving the reading skills of enlistees.

Lack of long-term evaluative data precludes comprehensive assessment of program effectiveness

Because the services almost never follow up on the long-term performance of reading program participants, valid evaluations of the quality and success rate of the respective services' programs are not possible. The remedial reading programs we visited usually measured the improvement in student's reading ability, and discharge rates were maintained through the basic training phase. Reading program personnel had no information about reading program participants once they had successfully completed recruit training.

EFFORTS TO REDUCE THE DIFFICULTY OF READING MATERIAL

In addition to the efforts to raise enlisted personnel's reading level, the services have also attempted to reduce the difficulty of some reading materials that personnel must use.

This approach is somewhat useful, but is very costly and limited because content must not be altered.

In 1974 the Navy began a $5 million, 5-year program to research its operational needs for improved technical data. The effort is to include an assessment of readability techniques, a cost-benefit analysis for rewriting material, and a field test of sample revisions to manuals to determine if readability is enhanced without losing quality.

In addition to the 5-year study, the Navy is researching job reading requirements by occupational speciality and the degree of mismatch between reading ability and reading materials. They are also identifying "readable writing" methods, techniques for basic skills training in reading, and alternatives to the written word. A style guide was being developed to provide technical and maintenance manual contractors with standards to be used in preparing Navy material.

Although the Navy has initiated numerous efforts to reduce the difficulty of written material, it has not systematically attempted to write material to specified levels; no standards have been adopted to indicate either the minimum reading level necessary for Navy service or the level needed for particular occupational fields.

The total cost to date for rewriting manuals and performing research in the readability area was not available. As noted above, one ongoing project will cost more than $5 million, and Navy researchers said that any extensive efforts in this area will cost several millions more.

We were unable to obtain a comprehensive profile of the scope and cost of Army, Air Force, and Marine Corps programs for reducing reading material complexity, but available information indicated that each service has taken some action in the area.

The Army has undertaken a $3 million program to redesign approximately 2,000 Army-wide publications, focusing on the style and method of material presentation. Another Army effort, entitled the "Improved Technical Documentation Training Program," is designed to make training material more understandable. Cost information was not available on the latter effort.

The Air Force has developed an inventory of reading requirements for 56 occupational fields considered to be representative of all career ladders in that service. The Air Training Command has provided guidelines for establishing

readability levels at which materials covering the various occupations should be written. We also noted that the Air Force was conducting research on the development and validation of improved methods for assuring the readability of texts. The ultimate goal is to develop a computerized method for diagnosing reading material and then prescribing improvements. Cost data on the Air Force's efforts was not readily available.

The Army has provided many of the training and field manuals used by the Marine Corps, whereas manuals detailing the operation and maintenance of equipment are usually provided by contractors. The difficulty in reading the Army-furnished manuals varies greatly.

Contractor-furnished manuals generally have been written at the 12th to 14th grade level. Recently, the Marine Corps adopted standards for such material. Operator manuals are said to be written at the sixth grade level, and maintenance manuals at the eighth grade level. The Marine Corps reviews incoming contractor-prepared material and if it is substantially above the standards established, the material is returned to the contractor for appropriate revision. The Marine Corps does not plan to rewrite manuals received before the readability standards were established.

FURTHER EFFORTS ARE NEEDED

In a September 1976 report on a tri-service "Conference on Reading and Readability Research in the Armed Services," the following recommendations were stated:

--The services should develop a comprehensive plan directed toward a total career development program.

--Functional (job related) literacy training should be provided rather than general literacy training.

--Oral language skills, as well as reading skills, should be considered in developing literacy training programs.

--More research should be done on the processes involved in reading and reading training.

Office of Education and National Institute of Education officials are interested in cooperating with DOD on the solution to the illiteracy problem. Several OE officials believe DOD has a general responsibility, as a large employer, to

provide literacy training so that military personnel will be more productive members of society. They believe that the services should have a major role in meeting societal goals in manpower training and in reducing unemployment.

DOD is aware that a large number of poor readers enlist in the military services, and that those individuals represent potential problems to efficient, effective, and economical operation. The individual services have taken some actions to improve the likelihood that poor readers will have successful military careers, but we believe that current actions have not been adequate nor managed well enough to minimize the illiteracy problem.

CHAPTER 4

ALTERNATIVES AVAILABLE TO ALLEVIATE THE ILLITERACY PROGRAM

More selective recruiting, better use of reading improvement programs, revised instructional techniques to increase comprehension during basic and advanced training, and reduced complexity of written material all represent alternatives for alleviating the problems associated with illiteracy in the services. Each has merits and drawbacks. A well-designed program for selecting, training, and utilizing enlisted personnel might employ a combination of approaches.

MORE SELECTIVITY IN RECRUITING COULD REDUCE THE NUMBERS OF POOR READERS

The number of poor readers entering the services could be reduced by applying more stringent entrance requirements for reading skills and educational attainment. These requirements could increase the overall quality and capability of enlistees and eliminate many of the problems associcated with poor readers. But other problems may surface as a result of the higher standards.

Total manpower requirements may not be achieved

Available data indicates that by imposing higher standards, the number of available qualified enlistees might be reduced and manpower might be insufficient to meet total military requirements. Navy researchers said, for example, that imposing a reading grade level requirement of 5.5 would have eliminated about 9 percent of the fiscal year 1974 Navy enlistees, and an eighth grade reading requirement would have eliminated over 18 percent of the enlistees. Available data from the other services also indicated that many recruits would have been ineligible for enlistment had reading standards, such as those applied by the Navy researchers, actually been in effect.

Although the imposition of required reading levels would affect availability of qualified recruits, evidence shows that the incidence of failure by the very poorest readers is so high that some minimum reading standard is needed. For example:

--Navy data covering the period June 1974 to January 1975 shows that 64 percent of the enlistees at one

training center that read below the fourth grade level were discharged before completing recruit training.

--Marine Corps data for the period February 1974 to August 1975 showed that 50 percent of the enlistees at its San Diego training site who read below 3.5 failed to complete recruit training.

--Air Force data for the period January 1973 through November 1974 showed that 75 percent of its remedial reading participants that read below a fourth-grade level were discharged during recruit training.

We believe it to be apparent that a required minimum reading level would be beneficial if established for military service in general and specific requirements set for each service. Also, consideration should be given to whether reading improvement programs should be used in addition to more selective recruiting to maximum the potential for a successful enlistment.

Academic achievement should be used cautiously as a guide in recruit selection

Military officials said that they have noted a high correlation between academic achievement and success in military life. Consequently, the services are attempting to upgrade the overall quality of their enlistees through more extensive recruitment of high school graduates. Available data supports that practice and educational attainment should be considered in the recruiting process.

We found, however, that educational attainment does not insure that an individual is a good reader. Therefore, the fact that an individual has a high school diploma does not guarantee that he can read well. The following data from each services' remedial reading programs indicates that from 36 to 60 percent of the poor readers were high school graduates.

High school graduates participating in selected remedial reading programs

Location	Percent of participants who were high school graduates
Naval Training Center, San Diego	55
Marine Corps Recruit Depot, San Diego	36
Lackland Air Force Base, Texas	60
Fort Knox, Kentucky	50

Because the services have experienced better than average success with high school graduates, that recruitment criterion should continue to be applied. However, in evaluating available recruits, the services should also be cognizant of an individual's reading ability because evidence indicates that even the high school graduate may be faced with all the problems typically associated with poor readers.

The press have recently reported on many instances of high schools giving diplomas to students who are functional illiterates. In a growing number of school systems, students are being required to pass a basic skills examination as a requirement for a diploma. In general, however, high school graduation is no guarantee of literacy.

NEED TO REEVALUATE LITERACY TRAINING PROGRAMS

An effective remediation program is a possible solution to the problem. As indicated earlier, researchers have determined that an extensive gap exists between enlistees' reading abilities and much of the reading material they must deal with during their military careers, even for those persons considered adequate in reading skills.

If the remediation programs are continued, we believe consideration should be given to refocusing the programs from the very poorest readers (most of whom should be eliminated through selective recruiting) to a broader segment of the enlisted population. This would narrow the gap between general reading skills and specific job-related reading requirements. An effort of that type would require expanding the services' current remediation concept. Such a program could be integrated with skills training, career counseling, and general education development. This approach could not only improve the operational effectiveness

of the services, but in the longer view, better prepare personnel for productive roles in society after completing their military careers.

REDESIGNED TRAINING PROGRAMS COULD ASSIST POOR READERS

Research in teaching methods has shown that alternatives to literacy training exist which could improve the productivity of poor readers. Greater use of video tapes, cassette tapes, and lectures could reduce the amount of reading required in training programs. Many instructors are already employing these techniques because they find such methods effective in communicating with all students, not just the poor readers. Although these techniques are effective for training purposes, it is not practical or desirable that such instructional methods be completely substituted for instruction requiring reading because

--the development of effective training programs without reading (and the necessary materials and equipment) is very costly; and

--an individual, upon completion of training, is expected to perform his job with reference to only the normal guidance materials, such as manuals, thus requiring reading skill.

The services should consider alternative instructional techniques to improve the comprehensibility of military training, but the revised techniques should not reduce the emphasis on the need for effective reading skills.

SIMPLIFYING READING MATERIALS CAN PARTIALLY ALLEVIATE THE PROBLEM

As discussed earlier, each service has taken some action to reduce the complexity of its reading materials, thus reducing the literacy gap between readers and their pertinent military literature. This technique is effective but must be used prudently because (1) rewriting extensive amounts of material would be very costly and (2) oversimplifying material can so dilute the content that it is no longer usable for its intended purpose.

Action has been taken within some Department of Defense activities to reduce the level of difficulty of some written material and to provide writing standards for military manuals and technical materials to be used by military personnel, so future enlistees may have less difficulty in comprehending

military literature. However, because of the prohibitive cost of rewriting all military literature and the fact that such rewriting has limits as to its effectiveness, this approach should be considered as one of a group of alternatives to be employed in making military personnel better able to comprehend written material.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The magnitude of the illiteracy problem in the services has never been fully assessed. Available evidence, however, indicates that poor reading ability among many enlisted personnel has a negative impact on the effective performance of their duties and on advancement. Furthermore, poor readers, who sometimes also have motivational or aptitudinal problems, tend to be discharged prematurely; many cannot complete basic training. Increased costs result from the illiteracy problem, including the investment in personnel who are prematurely discharged and the reduction in operational effectiveness among the services' units. There are also other implications, such as discharging personnel who do not have the basic skills necessary to enter the civilian work force.

The services have shown concern about the illiteracy problem by spending over $3 million annually on their remedial programs, committing over $8 million to make reading materials easier to comprehend, and conducting numerous (but piecemeal) research efforts, etc. Some progress has been made, but the overall illiteracy problem persists. Current efforts to correct the illiteracy problem have not been totally effective.

RECOMMENDATIONS

We recommend that the Secretary of Defense develop a policy to address the illiteracy problem and have the Department to:

--Determine the reading grade level required for each military occupation and assess the magnitude of the services' illiteracy problem within each occupation.

--Establish an overall minimum RGL required for enlistment that will still allow the services to meet their quantity goals, and consider establishing a specific RGL requirement to enter each occupation.

--Determine reading ability before enlistment so that if very poor readers do not qualify for military service, they can be counseled to seek help from civilian programs.

--Intensify efforts to reduce the complexity of written materials.

--Decide the extent of efforts to improve the reading skills of military personnel as a matter of general responsibility.

--Analyze the value and effectiveness of current remedial training programs in improving trainability and job performance.

--Should remedial programs be continued, make certain that they are integrated with skill training; career counseling; and general education development; and provide central, coordinated control of the programs including standardized eligibility criteria, course content, goals, and evaluation systems.

--Coordinate efforts with the U.S. Office of Education and the National Institute of Education to benefit from their expertise and research on the national illiteracy problem.

In view of the possible consequences of the illiteracy problem on the operational effectiveness of the military services, we recommend the Secretary of Defense consider reporting annually to the Congress on progress being made to alleviate the problem of illiteracy among military personnel.

LOCATIONS VISITED

RESEARCH ACTIVITIES

--Navy Personnel Research and Development Center, San Diego, Calif.

--Naval Health Research Center, San Diego, Calif.

--Human Resources Research Organization, Western Division, Monterey, Calif.

--Air Force Human Resources Laboratory, Lackland Air Force Base, Tex.

--International Training Consultants, Inc., Burbank, Calif.

RECRUIT TRAINING INSTALLATIONS

--Naval Training Center, San Diego, Calif.

--Marine Corps Recruit Depot, San Diego, Calif.

--U.S. Army Armor Center, Fort Knox, Ky.

--Air Force Military Training Center, Lackland Air Force Base, Tex.

TRAINING COMMANDS

--Chief of Naval Education and Training, Pensacola, Fla.

--U.S. Army Training and Doctrine Command, Fort Monroe, Va.

--Air Training Command, Randolph Air Force Base, Tex.

OTHER LOCATIONS

--U.S. Office of Education, Washington, D.C.

--Office of the Secretary of Defense, Washington, D.C.

CHARACTERISTICS OF DOD READING REMEDIATION PROGRAMS (note a)

Course	Course length	Type of instructors	Time of implementation	Percent of recruits tested (note b)	RGL entry criteria	RGL program objective	1975 Program data: Total recruits	Number of: Participants	Number of: Graduates	Number of: Discharges	Average: Pre-test scores	Average: Post-test scores	Average: Gain
Academic remedial training:													
Naval Training Ctr. San Diego, Calif.	2 1 2 wks (average)	military	start of recruit training	about 10	3.0-5.5	2.0 gain or 5.0	28,771	377	280	97	4.6	6.2	1.6
Naval Training Ctr. Great Lakes, Ill.	5 wks	military	3d week of recruit training	39	3.0-6.0	improved reading ability	35,196	312	194	118	(c)	(c)	(c)
Naval Training Ctr. Orlando, Fla.	6 wks	military & civilian	1st week of recruit training	100	3.0-6.0	6.0	30,000	231	191	40	5.0	7.0	2.0
Academic proficiency platoon:													
Marine Corps Recruit Depot, San Diego, Calif.	4 wks	civilian	1st wk of recruit training	66	d/4.5	2.0 gain	29,746	711	611	37	3.9	6.1	2.2
Reading improvement program:													
Lackland Air Force Base, Tex.	2-8 wks	military	2d wk of recruit training	15	below 6.0	6.0 or 2.0-3.0 gain	75,000	310	294	16	5.2	7.5	2.3
Advanced individual training/preparatory training:													
Ft. Leonard Wood, Mo.	6 wks	(c)	after basic training	all mental categories III & IV	below 5.0	2.0 gain	30,249	636	562	74	4.5	6.0	1.5
Ft. Bliss, Tex.	3-6 wks	civilian	after basic training	100	below 6.0	7.0	5,457	333	318	(c)	5.0	7.5	2.5
Ft. Jackson, S.C.	(c)	civilian	after basic training	100	6.2 & below	7.0 or 2.0 gain	44,694	1,228	1,272	22	5.0	6.4	1.4
Ft. Gordon, Ga.	6 wks	civilian	after basic training	100	below 7.0	7.0	2,059	21	13	5	4.7	6.3	1.6
Ft. Dix, N.J.	6 wks	civilian	after basic training	67	below 6.1	7.0 or 2.0 gain	27,450	879	816	63	3.1	5.6	2.5
Ft. Knox, Ky.	1-6 wks	civilian	after basic training	64	below 6.3	improved reading ability	28,216	783	771	12	5.0	6.9	1.9
Ft. Sill, Okla.	3-6 wks	civilian	after basic training	70	below 6.0	2.0 gain or 7.0	(e)	(e)	(e)	(e)			

NOTE: Remediation programs were not offered at Ft. McClellan, Ft. Polk, and Marine Corps Recruit Depot, Parris Island.

a/Data compiled from responses to our questionnaire; not independently verified.

b/Represents the percentage of all recruits who are given a reading test.

c/Data unavailable.

d/Reading comprehension score only.

e/Program recently began; data unavailable.

APPENDIX II

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